

NON-PUBLIC?: N
ACCESSION #: 8809200055

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Fermi 2 PAGE: 1 of 4

DOCKET NUMBER: 05000341

TITLE: Main Turbine Trip on High Vibration of Bearings #8 and #9
EVENT DATE: 08/13/88 LER #: 88-030-00 REPORT DATE: 09/12/88

OPERATING MODE: 1 POWER LEVEL: 078

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Gordon Nader, Licensing Engineer TELEPHONE #: 313-586-4513

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On August 13, 1988 at 0722 hours a Main Turbine Generator (MTG) trip was automatically initiated because of high main turbine bearing vibration. As designed, the turbine trip from high power initiated an automatic reactor scram due to fast closure of the MTG stop and control valves. The scram initiated a reactor water level 3 actuation and a level 8 trip. Control room personnel responded to the turbine trip and reactor scram and secured the plant in a stable condition. During this event all safety systems functioned normally.

Subsequent to the plant shutdown the General Service Water flow control valve to the Main Turbine Generator (MTG) lube oil coolers was found to have failed open. The failed open valve provided additional cooling to the lube oil coolers. This additional oil cooling caused oil whirl to initiate which increased the turbine vibration above the bearing trip circuit setpoints.

The number 8 bearing vibration circuit was recalibrated. The failed temperature control valve for the MTG lube oil coolers has been repaired. The possibility of increasing the low turbine lube oil temperature alarm setpoint will be investigated.

(End of Abstract)

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Initial Plant Conditions:

Operational Condition: 1 (Power Operation Steady State)

Reactor Power: 77.5 percent

Reactor Pressure: 968 psig

Reactor Temperature: 545 degrees Fahrenheit

Description of Event:

At 0717 hours on August 13, 1988, on load pre-trip high vibration alarms were received from Main Turbine Generator (MTG) bearing numbers 8 and 9. These alarms cleared four seconds later. Bearings number 8 and 9 are located between the last low pressure stage of the turbine and the main generator. The alarms reoccurred momentarily at 0718 and 0721 hours. At 0722 hours the alarms once again occurred and number 8 bearing reached its trip level setpoint and number 9 bearing reached its pre-trip level setpoint; this condition initiated a turbine trip (JJ) as designed.

The turbine trip initiated a reactor scram due to turbine stop valve fast closure. The reactor scram void collapse initiated a reactor water level 3 actuation that caused a Group 3 - Residual Heat Removal System (BO), Group 13 - Drywell Sump System (WK) and Group 15 - Traversing In-core Probe System (IG) isolation valve closure. The Torus Water Management System isolated on high torus room sump level due to scram discharge volume draining. Subsequently, a high reactor water level 8 actuation tripped the main feedwater pumps which were operating and sent trip signals to the High Pressure Coolant Injection (BJ) and Reactor Core Isolation Cooling Systems (BN) which were not operating at the time. All safety related systems functioned as anticipated and the plant was stabilized in operational condition 3 (Hot shutdown) by 0800 hours. The vibration detection circuits for #8 and #9 circuits were checked and #8 was found slightly low out of tolerance.

Cause of Event:

Because the turbine vibration circuits were inspected and verified to be functioning normally the root cause of the vibration was directed to non-turbine vibration circuitry. The General Service Water System's (KG) inlet water control valve for the lube oil coolers was found failed open because of a damaged control air line. (The cause of the air line failure is unknown.) It is known that a decrease in the lube oil temperature will

cause turbine vibration to increase. Thus, the most probable cause for this event is transient turbine lube oil cooling.

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The decrease in lube oil temperature resulted in an oil whirl condition. No high vibration alarms were received until five minutes before the turbine trip and subsequent turbine operation has shown no vibration abnormalities with stable lube oil temperatures.

The level 8 trip was a result of an inadequate post scram setdown (JK) setpoint circuit (this circuit is designed such that after a scram a decreased reactor water level signal is given to the feedwater controller to prevent high reactor water levels).

Analysis of the Event:

The Reactor Protection System (RPS) responded to the Turbine Generator trip as designed. All Emergency Safety Systems functioned properly allowing the plant to be secured in safe shutdown. Had this occurred under other plant conditions (e.g., higher power level) the event would not have been any more severe.

This event did not pose any danger to the health and safety of the public or plant personnel.

Corrective Actions:

The broken air line to the cooler inlet valve has been repaired. The line was broken at the fitting on the valve.

The number 8 bearing vibration loop circuit has been recalibrated. The other vibration circuits which were not involved in the trip have also been examined.

The possibility of increasing the turbine lube oil low temperature alarm setpoint will be evaluated (Potential Design Change 9437). A design change (PDC 9413) to reduce background noise levels in the MTG vibration detection circuits has been installed. As additional insurance against "spurious" trips, a ten second time delay is being added to the vibration circuit (PDC 9403).

A Potential Design Change (PDC 9423) for correction of the main feedwater pump post scram level setdown control circuit will be evaluated. Plant safety is not affected by the existing post scram setdown circuit because the failure of this circuit is bounded by the Feedwater Controller Failure

Analysis (UFSAR Chapter 15.1.2). The level 8 trip ensures high reactor water levels do not occur such that there are no detrimental effects due to water carry over into the steam lines.

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Similar Occurrences

There has been one previous occurrence of a MTG (TG) vibration trip initiating a Reactor Scram. That event does not directly relate to this one because it was caused by loose wiring at a vibration sensing device.

ATTACHMENT # 1 TO ANO # 8809200055 PAGE: 1 of 1

William S. Orser
Vice President
Nuclear Operations 10CFR50.73

Detroit Edison Nuclear Operations
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6400 North Dixie Highway
Newport, Michigan 48166 September 12, 1988
(313) 586-5300 NRC-88-0210

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Reference: Fermi 2
NRC Docket No. 50-341
Facility Operating License No. NPF-43

Subject: Licensee Event Report (LER) No. 88-030-00

Please find enclosed LER No. 88-030-00, dated September 12, 1988, for a reportable event that occurred on August 13, 1988. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Gordon Nader at (313) 586-4513.

Sincerely,
/s/

Enclosure: NRC Forms 366, 366A

cc: A. B. Davis

J. R. Eckert
R. C. Knop
T. R. Quay
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Wayne County Emergency
Management Division

*** END OF DOCUMENT ***
